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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

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ART UNIT PAPER NUMBER

1773

DATE MAILED: 02/24/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/646,198

Applicant(s)

MATSUI ET AL.

Examiner

Nikolas J. Uhler

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. This office action is in response to the amendment dated 12/04/02. The examiner acknowledges applicants amendment, which requires that the instant invention now comprise a "single piece" light metal part. A new rejection on the merits addressing this limitation follows. Further, the examiner acknowledges applicant's amendment to remove the improper multiple dependencies from claims 6-9. Accordingly, these claims have been treated on the merits. Last, the examiner acknowledges applicants amendment to remove the cited 112 issues that were present in the claim. Accordingly, the rejection under 35 U.S.C 112 is withdrawn.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 1-7, and 9 and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prieto et al. (US5427171) in view of Sakota et al. (EP0730040), further in view of Kaumle et al. (US6068890)
4. Regarding the limitations of claims 1 and 13, wherein the applicant requires a method for fabricating a light-metal casting (specifically an aluminum wheel), comprising the steps of: casting a single piece light metal part by applying a casting pressure of more than about 50 MPA from an ejection plunger to a molten metal of a light metal material poured into a die, to form a casting having pinholes generated in a casting surface, wherein the generation of pinholes is suppressed to meet a predetermined condition; polishing the casting to reduce a roughness of a polished surface obtained by

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polishing said casting surface to not more than a predetermined value; painting the polished casting to form a first resin layer on said polished surface; and plating said painted casting to form a layer of a metal or a metal compound through dry type plating on a surface of said resin layer.

5. To be clear on the record, the examiner interprets "light metal" to mean "aluminum, or aluminum alloy" as no other light metals are supported by the specification. Further, the examiner interprets "dry plating" to mean "sputtering, vacuum evaporation, and ion plating" as is commensurate with the description of "dry plating" on page 16, lines 13+ of the instant specification.

6. With respect to these limitations, Prieto et al. (hereafter Prieto) teaches a method for manufacturing a single piece aluminum or aluminum alloy wheel via casting (column 5, lines 10-35, column 1, lines 53-60) (equivalent to applicants required "single piece light metal part"). The method comprises the steps of feeding molten metal into a mold through a sprue (equivalent to applicants claimed ejection plunger) by either gravity feed or pressure injection to form a wheel casting (column 8, lines 45-55).

7. However, Prieto does not teach forming the single piece aluminum alloy wheel via a method in which a pressure of 50 MPA or more is applied to the molten metal, as required by claim 1.

8. With respect to this deficiency, Sakoda et al. (hereafter Sakoda) teaches a method for forming cast aluminum parts, specifically cast aluminum parts for use in vehicle wheels (page 2, lines 5-9). In this casting method, aluminum or an aluminum alloy is cast in a mold at a pressure of $>500\text{kgf/cm}^2$ (50MPa). Sakoda teaches that if

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casting is performed at pressures less than 500kgf/cm^2 , the cast aluminum is likely to crack, shrink, and exhibit reduced mechanical performance (page 4, lines 36-40).

9. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize $>50\text{MPa}$ pressure as taught by Sakoda in the method for casting a single piece aluminum alloy wheel taught by Prieto.

10. One would have been motivated to make such a modification due to the teaching in Sakoda et al. that casting aluminum at less than 500KGF/cm^2 produces a product that is likely to crack, shrink, and exhibit reduced mechanical properties.

11. The examiner acknowledges that the invention of Sakoda is directed towards forming a multipart aluminum alloy wheel. However, Sakoda never explicitly states that the method could not be utilized to form a single piece wheel. Further, the benefits of the high pressure casting method would extend to any cast aluminum part. Thus, in view of the fact that Prieto teaches forming a single piece aluminum alloy wheel via casting, and the teaching in Sakoda of the benefits of high-pressure casting, there is motivation to one of ordinary skill in the art to combine the references with a reasonable expectation of success. Thus, the limitations of claim 1 regarding the casting limitations are met.

12. However, Prieto as modified by Sakoda does not teach polishing a casting to reduce surface roughness, painting the polished casting with a resin material, and dry plating the painted casting with a layer of metal or metal compound.

13. Regarding these deficiencies, Kaumle et al. teaches a method for gloss coating articles of manufacture, in particular vehicle parts such as wheels or rims (column 1,

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lines 10-15). Kaumle et al. specifically teaches a method for coating an aluminum or aluminum alloy wheel, wherein the method comprises the following steps: 1. Providing the metal wheel. 2. Mechanically polishing the surface of the metal wheel (equivalent to applicants polishing step). 3. Coating the smoothed surface with a process optimized powder (a powdered paint) finish (equivalent to applicants resin coating step). 4. Coating the process optimized powder layer with a glossy metal/metal alloy layer via magnetron sputtering (equivalent to applicants dry plating step) (column 2, lines 35-42). The method results in a lightweight wheel that exhibits a metallic gloss (column 1, lines 10-15)

14. Therefore it would have been obvious to utilize the polishing, painting, and metal coating steps taught by Kaumle et al. to gloss coat the aluminum alloy wheel taught by Prieto as modified by Sakoda.

15. One would have been motivated to make this modification due to the aesthetic benefits that would be gained. This is a particularly strong motivation, as aesthetic qualities such as gloss, luster, and sheen are well established in the art of wheels to be highly desirable.

16. Regarding the limitations of claim 5, wherein the applicant requires the surface of the polished surface to be less than 6.3μ . Kaumle et al. teaches that the roughness of the aluminum surface before application of the base coat (powdered paint layer) impacts the adhesion of the metal layer (column 5, lines 9-18). Thus, the examiner takes the position that the surface roughness of the alloy wheel is a results effective variable, and it would have been obvious to one with ordinary skill in the art to change

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the surface roughness to a desired R_{max} in order to achieve a desired level of coating adhesion.

17. Regarding the limitations of claim 6, wherein the applicant requires the first resin layer to have a thickness of $10-40\mu$. Kaumle et al. teaches that the powdered paint layer (equivalent to applicants claimed first resin layer) is preferably $30-300\mu$ thick (column 3, lines 25-30). As 30μ is completely encompassed within applicants claimed range, the limitations of claim 6 are met.

18. Regarding the limitations of claims 7 and 9, wherein the applicant requires a transparent second resin layer to be formed on the metal or metal compound layer at a thickness between $20-50\mu m$. Kaumle et al. teaches that a $20-30\mu m$ protective layer of transparent polyurethane (equivalent to applicants claimed transparent resin) is applied to the metal layer (column 3, lines 40-45). As $20-30\mu m$ is completely encompassed by applicants claimed range, the limitations of claims 7 and 9 are met.

19. Regarding the limitations of claims 11, wherein the applicant requires the dry type plating to be a sputtering process. Kaumle teaches applying the metal layer via magnetron sputtering, as stated above for claim 1. Thus, the limitations of claim 11 are met.

20. Regarding claim 12, wherein the applicant requires the casting step to include a pressurizing step for applying via a pressurizing pin a pressurizing force to a predetermined portion of the molten metal. Prieto as modified by Sakoda teaches the required pressurizing step as stated above for claim 1.

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21. Regarding claims 15-16, wherein the applicant requires the wheel to be made of aluminum or aluminum alloy. Kaumle et al. teaches that aluminum or aluminum alloy wheels can be used (column 5, lines 35-45).

22. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the cast wheel out of aluminum or aluminum alloy, as these materials are taught to be equivalent to one another as materials for forming cast automobile wheels.

23. Regarding claims 1-4 and 14, wherein the applicant requires that the light-metal casting have small pinholes in its surface, wherein the number of pinholes is less than 10 per 100cm², have a maximum open diameter of 2mm, and the number of pinholes having a maximum open diameter between 1-2mm is 1 or 0. Although Prieto as modified by Sakota and Kaumle do not specifically disclose these requirements, the examiner takes the position that these limitations are met as the combination results in a wheel that is manufactured from an identical light metal (aluminum or aluminum alloy), via the same method (casting), under high (>50Mpa) pressure. Thus, the examiner takes the position that the pinhole limitations required by claims 1-4 and 14 are necessarily met.

24. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prieto modified by Sakota and Kaumle as applied to claim 1 above, and further in view of Ohtani et al. (US4542070).

25. It is noted that Kaumle teaches applying an adhesion-improving layer between the powdered paint layer and the substrate for the purpose of improving the adhesion of

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the powdered paint layer (column 3, lines 20-25). This adhesion-improving layer is equivalent to applicants claimed primer layer between the substrate and first resin layer.

26. However, Prieto as modified by Sakota and Kaumle does not teach a primer between the metal layer and the second resin layer, as required by claim 8.

27. However, Ohtani et al. teaches that the adhesion of a polyurethane layer to a metal substrate is improved by applying a primer to the surface of the metal substrate prior to applying the polyurethane (column 1, lines 42-62).

28. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a primer as taught by Ohtani et al. between the polyurethane topcoat and the metal layer in Prieto as modified by Sakota and Kaumle.

29. One would have been motivated to make such a modification due to the teaching in Ohtani et al. that the adhesion of a polyurethane layer to a metal layer is improved by applying a primer to a metal substrate prior to applying the polyurethane.

30. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prieto modified by Sakota and Kaumle as applied to claim 1 above, and further in view of Nishimura et al. (JP08041410).

31. For the purpose of this examination the examiner has utilized a machine translation of the Nishimura et al. document to provide the basis for this rejection. A copy of this translation and the original Japanese accompanied a prior office action.

32. Prieto as modified by Sakoda and Kaumle does not teach the limitations of claim 10, wherein the applicant requires the polishing step to comprise barrel polishing.

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33. However, Nishimura et al. teaches a method for polishing an aluminum wheel via barrel polishing (abstract). This method is typically used to pretreat the surface of a aluminum alloy wheel prior to the wheel surface being coated with a plating or paint material (section 38) Nishimura et al. teaches that shot peening is conventionally used in the art to polish aluminum wheels, but results in a relatively rough surface that is undesirable and inhibits the adhesion of subsequent plating or paint coatings that are applied to the wheel surface (section 4). Nishimura et al. teaches that if an aluminum wheel is polished via barrel finishing as opposed to shot peening, the surface roughness of the wheel can be reduced beyond that which is achievable via a shot peening method (section 7).

34. Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to utilize the barrel polishing method taught by Nishimura et al. to smooth the surface of the alloy wheel taught by Prieto as modified by Sakoda and Kaumle et al.

35. One would have been motivated to make this modification due to the teaching in Kaumle et al. that decreasing the surface roughness of an aluminum wheel increases the adhesion of subsequent coatings that are applied to the wheel surface, and the teaching in Nishimura et al. that barrel polishing can achieve significantly lower surface roughness than a standard shot peening method, which is the most common wheel polishing method known in the art.

Response to Arguments

36. Applicant's arguments with respect to claims 1-5 and 10-16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

37. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 703-305-0179. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on 703-308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0389.



nju
February 11, 2003



STEVAN A. RESAN
PRIMARY EXAMINER